NTSB National Transportation Safety Board

General Aviation Safety, How Are We Doing?

Sun-n-Fun
April 25, 2015

Earl F. Weener, Ph.D.
Member, NTSB

N6529R - B36TC Bonanza

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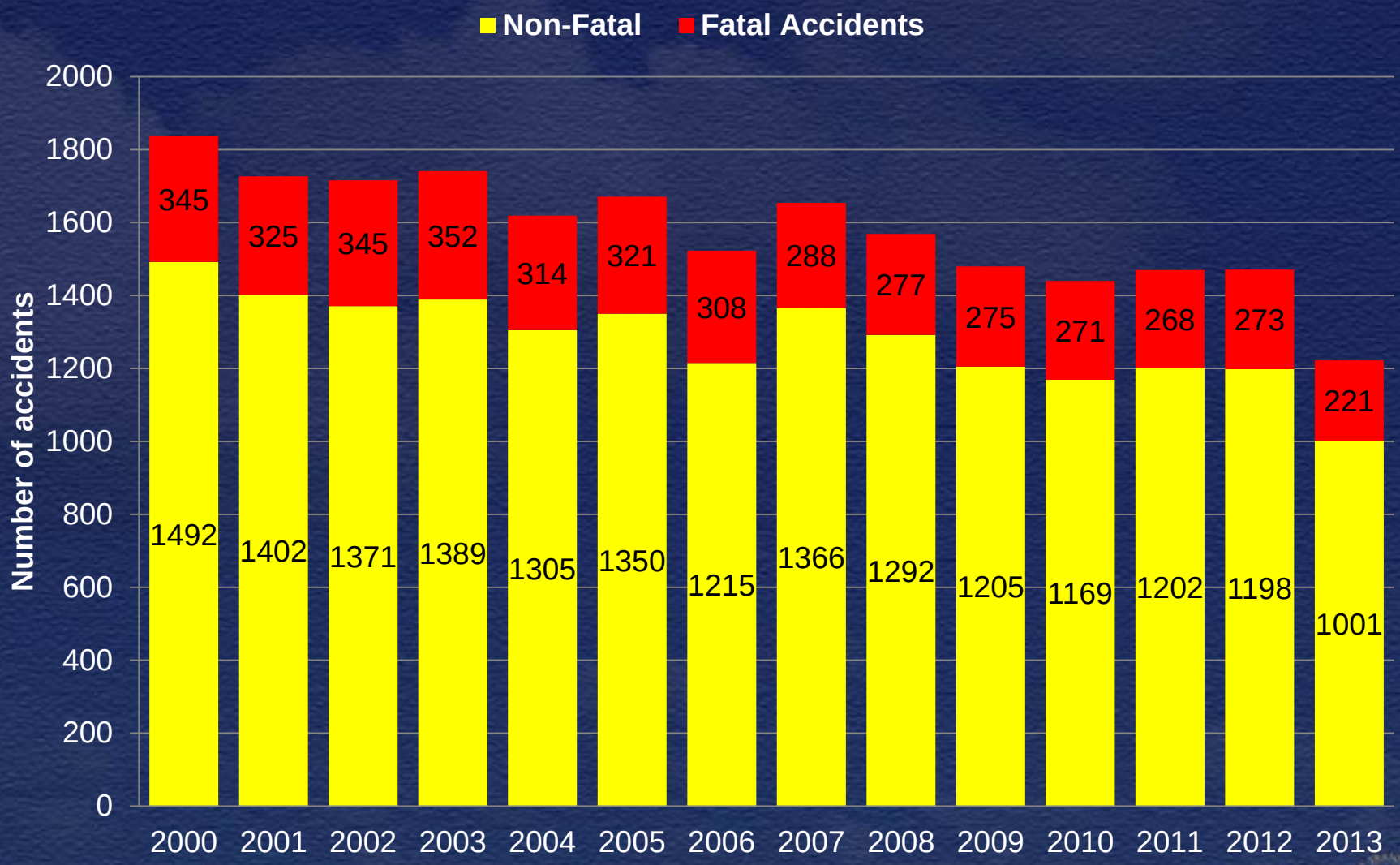
NTSB Mission

The NTSB is an independent US federal agency charged with determining the probable cause(s) of transportation accidents, making recommendations to prevent their recurrence, conducting special studies and investigations, and coordinating resources to assist victims and their families after an accident.

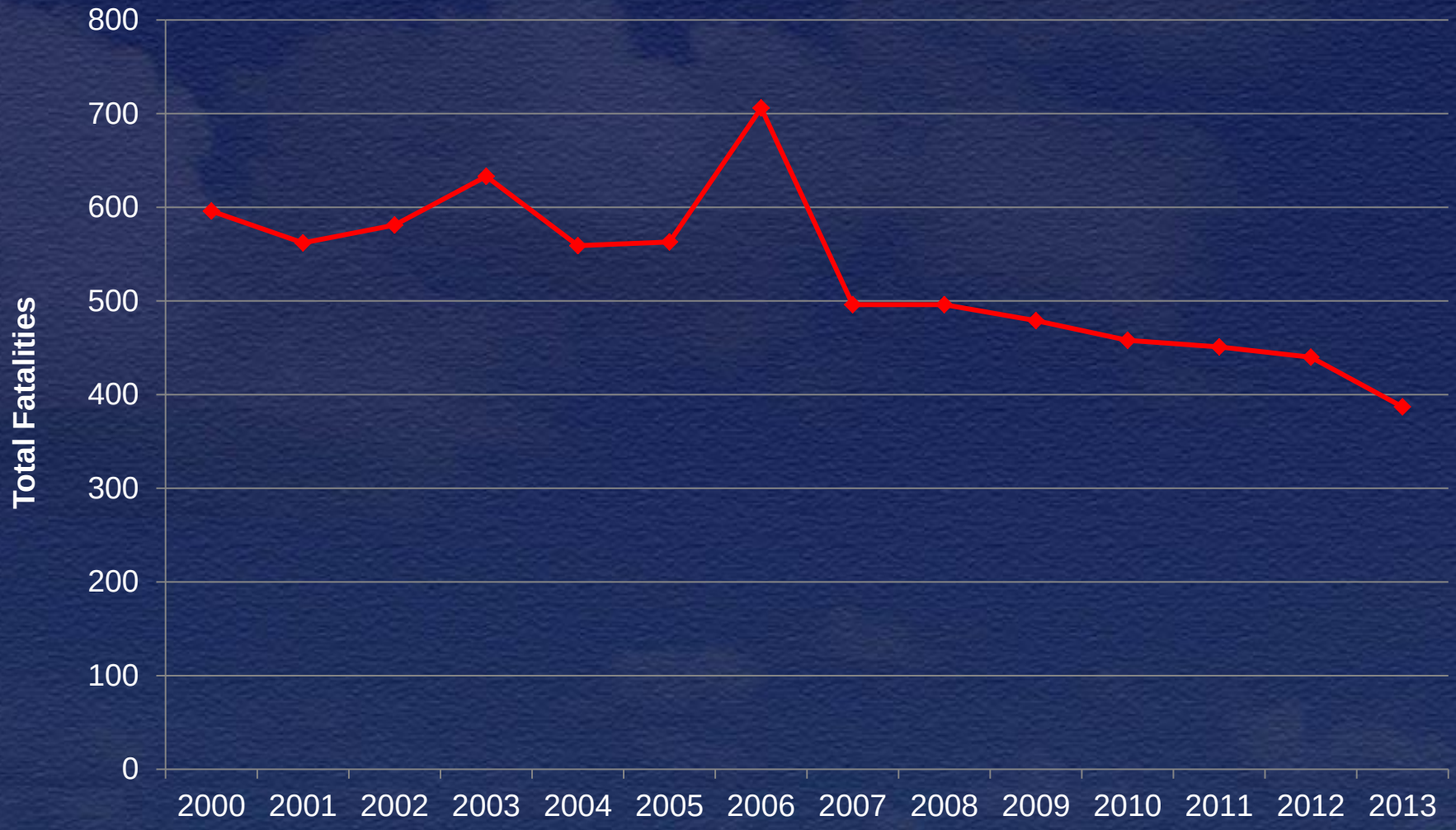
Topics

- General Aviation Accident Trends
- Most Wanted List – 2015
  - Distractions
  - Substance Impairment
  - Fitness for Duty
  - Loss of Control
  - Procedural Compliance
- NTSB Mission
- NTSB Investigations

All GA Accidents



GA Accident-involved Fatalities



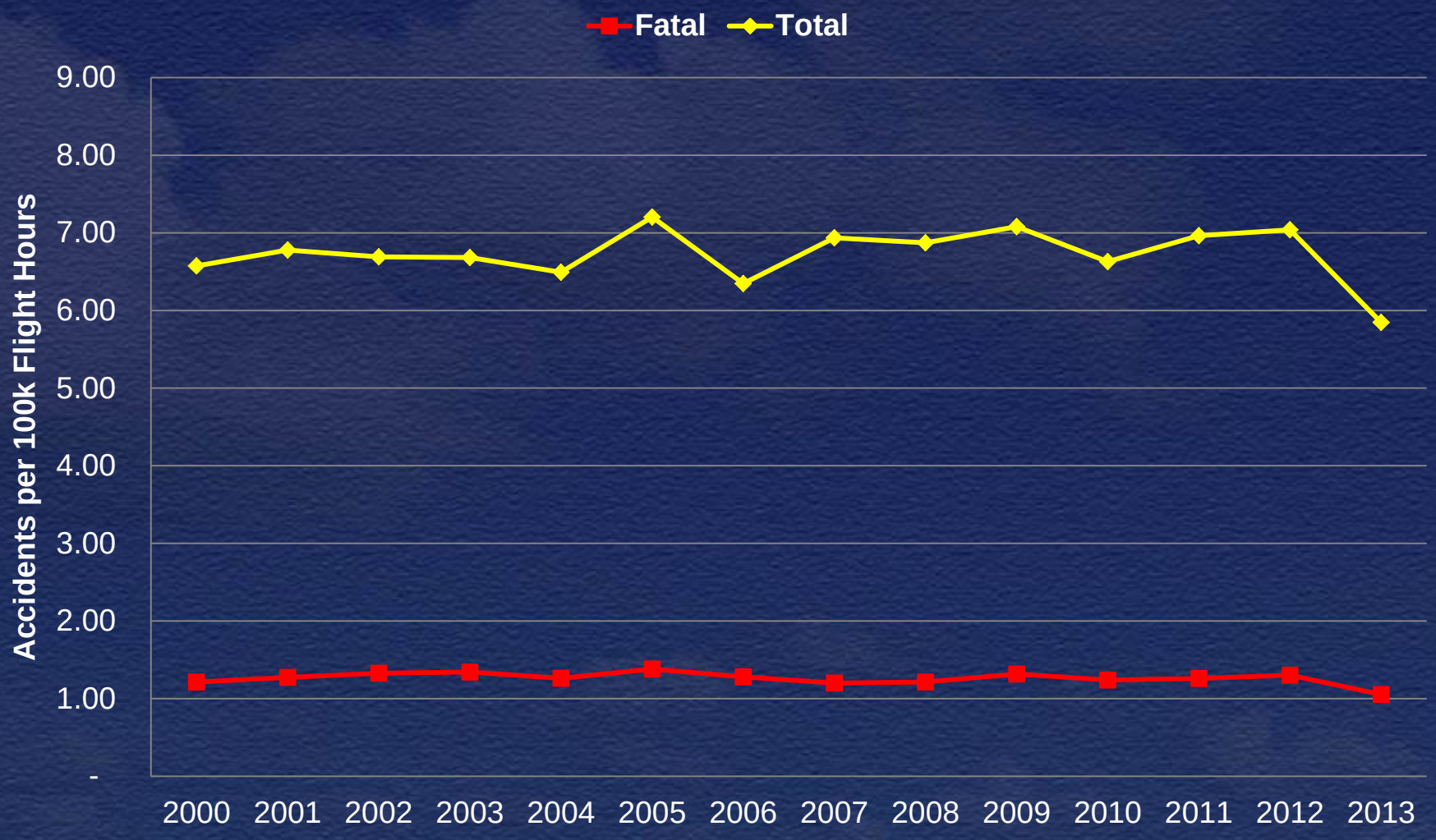
Accident Statistics - 2013

- 1,298 Total Accidents (Down from 1,537 in 2012)
  - 236 Fatal Accidents
    - 429 Fatalities
- 1,224 General Aviation Accidents
  - 222 Fatal Accident
    - 390 Fatalities
- 51 Part 135 Accidents
  - 12 Fatal Accidents
    - 30 Fatalities

Preliminary Accident Statistics - 2014

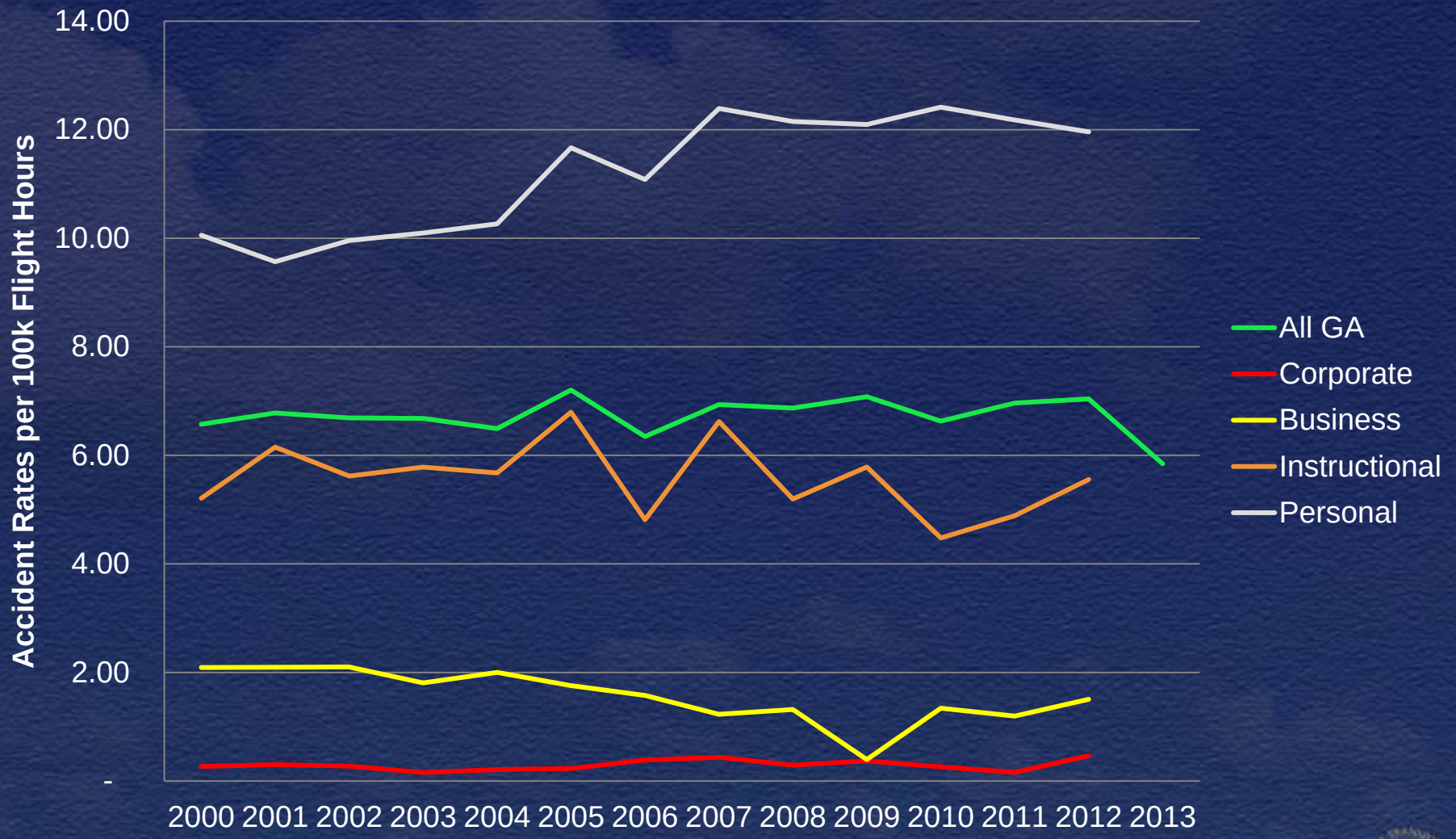
- 1,264 Total accidents (down from 1298)
  - 258 Fatal accidents (up from 236)
- 1,202 General Aviation Accidents (down from 1224)
  - 250 Fatal Accidents (up from 222)
    - 405 Fatalities (up from 380)
- 38 Part 135 Accidents (down from 51)
  - 8 Fatal Accidents (down from 12)
    - 20 Fatalities (down from 30)
- 33 Accidents Business/Corporate

GA Accident Rates



*The 2011 GA Survey is currently not available. FAA is actively engaged in re-calibration efforts and expect to have validated 2011 data published at a later date.

Accident Rates per 100k Flight Hours



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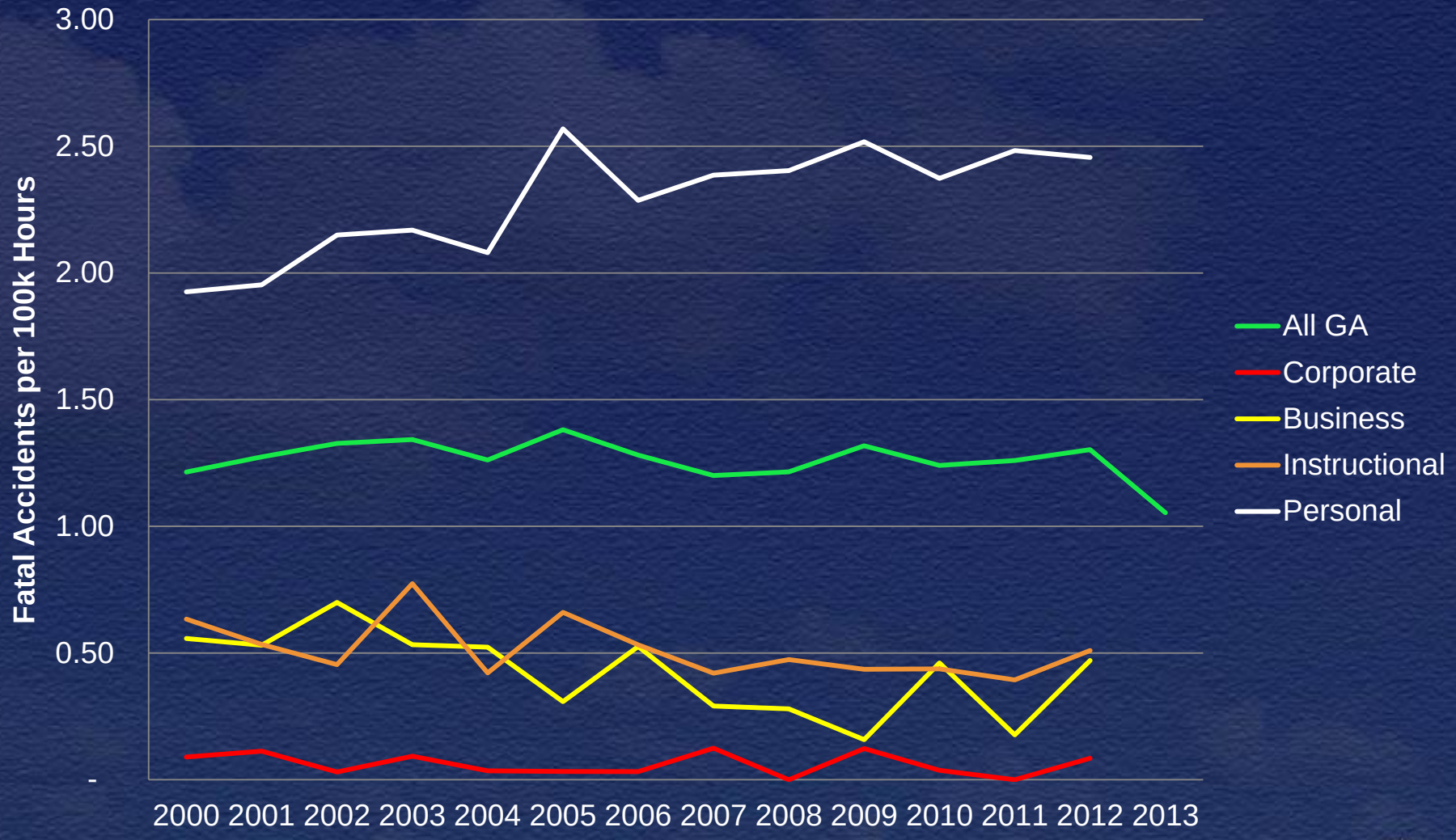
Fatal Accident Rates per 100k Flight Hours



*The 2011 GA Survey is currently not available. FAA is actively engaged in re-calibration efforts and expect to have validated 2011 data published at a later date.

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Defining Fatal Accident Events All Part 91 GA 2008-2012

- Loss of Control in Flight
- System/Component Failure – Powerplant
- Controlled Flight into Terrain
- Collision with Terrain/Object (non-CFIT)
- VFR Encounter with IMC
- System/Component Failure – Non-Powerplant

Why GA on the Most Wanted List?

- NTSB investigates approximately 1500 GA accidents per year over the last decade
- Overall GA accident rate flat
  - Has improved little over the last decade
  - Airline accident rate decreased more than 80%
- Personal flying accident rate
  - Increased 20% over last 10 years
  - Fatal rate increased 25% over that period

- ***GA safety needs attention***

NTSB 2015 Most Wanted List

- Disconnect from Deadly Distractions
- End Substance Impairment in Transportation
- Enhance Public Helicopter Safety
- Implement Positive Train Control in 2015
- Improve Rail Tank Car Safety
- Make Mass Transit Safer
- Prevent Loss of Control in Flight in General Aviation
- Require Medical Fitness for Duty
- Strengthen Commercial Trucking Safety
- Strengthen Procedural Compliance

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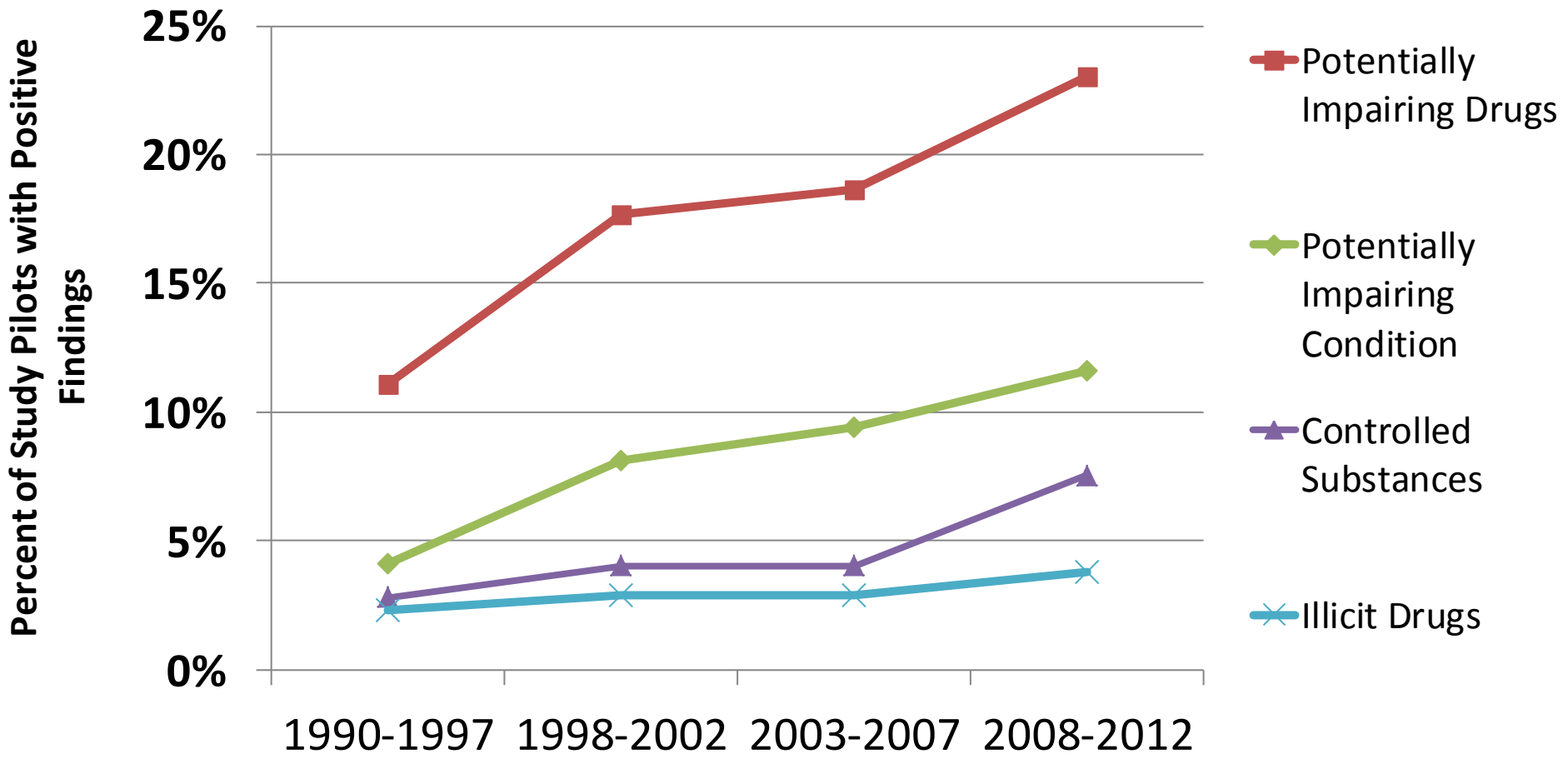
2015 MWL - Distractions

- ***Disconnect from Deadly Distractions***
  - A factor in all modes of transportation
- Aviation emphasis
  - Sterile Cockpit
  - Appropriate use of PEDs
  - Manage distractions

2015 MWL - Impairment

- ***End Substance Impairment in Transportation***
  - A factor in all modes
- Fatally injured pilots - potentially impairing drugs
  - 11% average 1990 - 1997
  - 23% average 2008 - 2012

Toxicology Findings by Category, 1990-2012



Most Common Drugs

- Sedating antihistamines
  - Most common category
- Diphenhydramine
  - Most common individual drug
  - Most common potentially impairing drug
  - Use INCREASING

Drug Facts

Active ingredient (in each capsule) — **Purpose**

Diphenhydramine HCl 25 mg ..... Antihistamine

Uses

- temporarily relieves these symptoms due to hay fever or other upper respiratory allergies:
  - runny nose
  - sneezing
  - itchy, watery eyes
  - itching of the nose or throat
- temporarily relieves these symptoms due to the common cold:
  - runny nose
  - sneezing

Warnings

Do not use with any other product containing diphenhydramine, even one used on skin

Ask a doctor before use if you have

- a breathing problem such as emphysema or chronic bronchitis
- glaucoma
- trouble urinating due to an enlarged prostate gland

Ask a doctor [illegible] taking sedatives or tranquilizers

When using this product

- marked drowsiness may occur
- avoid alcoholic drinks
- alcohol, sedatives, and tranquilizers may increase drowsiness
- be careful when driving a motor vehicle or operating machinery
- excitability may occur, especially in children

If pregnant or breast-feeding, ask a health [illegible] before use.

Keep out of reach of children. In case of overdose, get medical help or contact a Poison Control Center right away. (1-800-222-1222)

Directions

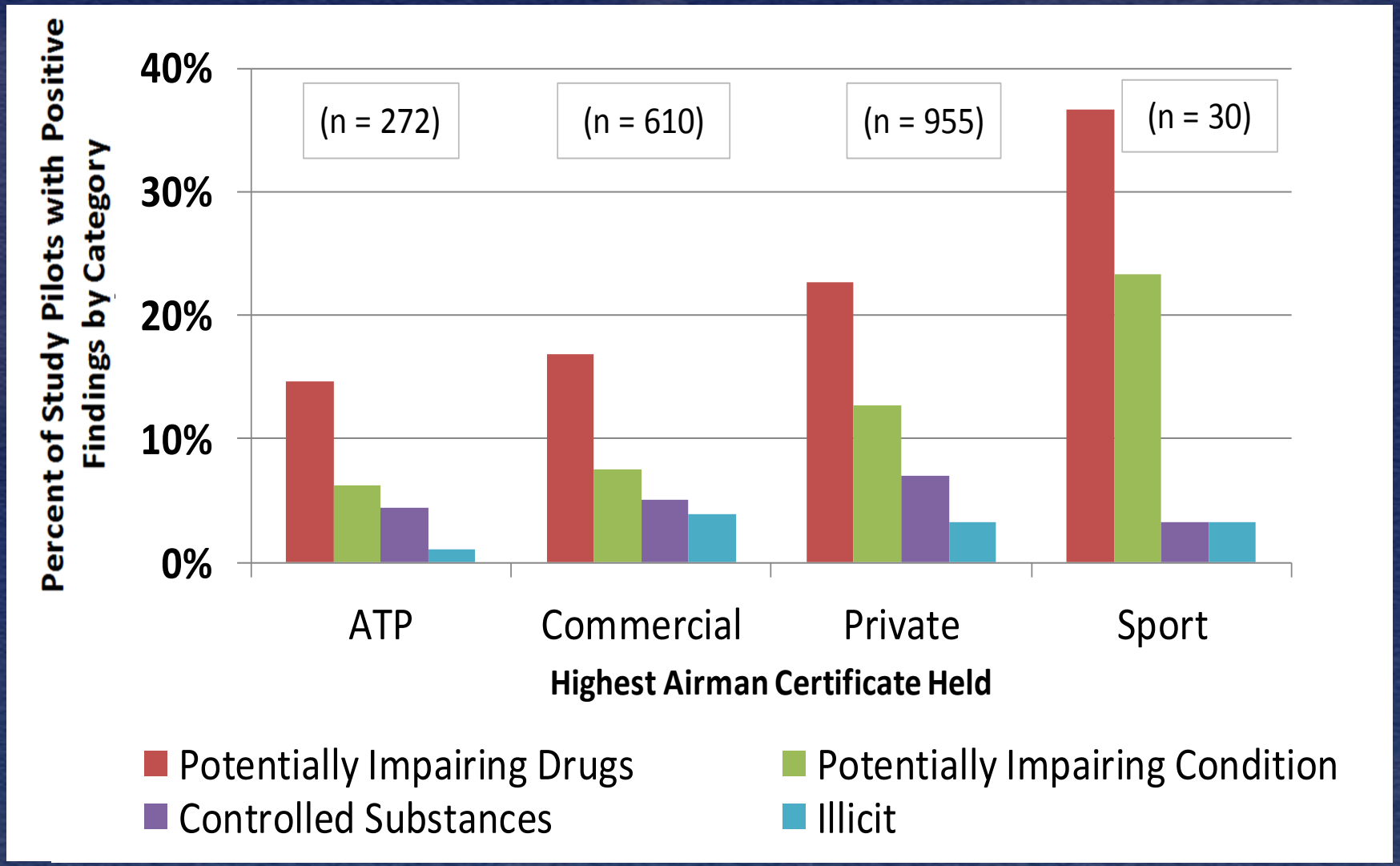
- take every 4 to 6 hours
- do not take more than 6 doses in 24 hours

adults and children 12 years and over	1 to 2 capsules
children 6 to under 12 years	1 capsule
children under 6 years	do not use this product in children under 6 years of age

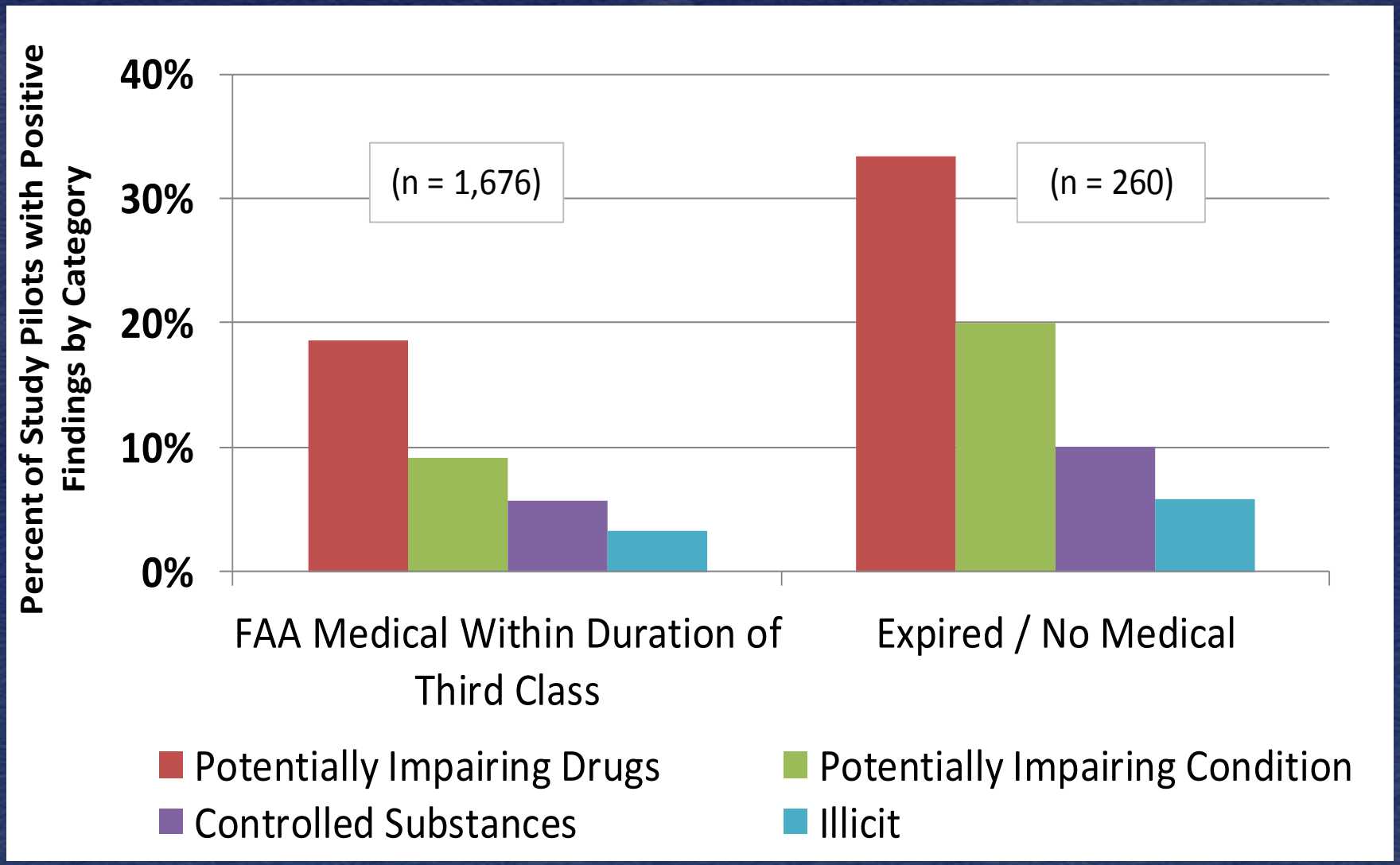
Other information

- store at 59° to 77°F in a dry place. Protect from heat, humidity, and light.
- **do not use if carton is open or blister unit is broken**
- see side panel for lot number and expiration date

Toxicology Findings by Certificate, 2005-2012



Toxicology Findings by Medical, 2005-2012



Medical Resources for Pilots

- FAA Publications
  - *Medications and Flying*
  - *Guide for Aviation Medical Examiners*
- Aircraft Owners and Pilots Association (AOPA)
  - Member resources

Medical Resources for Pilots

- General Aviation Joint Steering Committee (GAJSC)
  - 2013 Letter to pilots
  - 2014 Initiatives
    - Drug database
    - Training course

2015 MWL – Fitness for Duty

- ***Require Medical Fitness for Duty***
  - A factor in all modes
- Airman Medical – fitness at exam time
- Pilots must self-assess fitness
  - Need for appropriate flight preparations
- Focus on medical conditions
  - Example – Obstructive Sleep Apnea
- Enhance medical knowledge

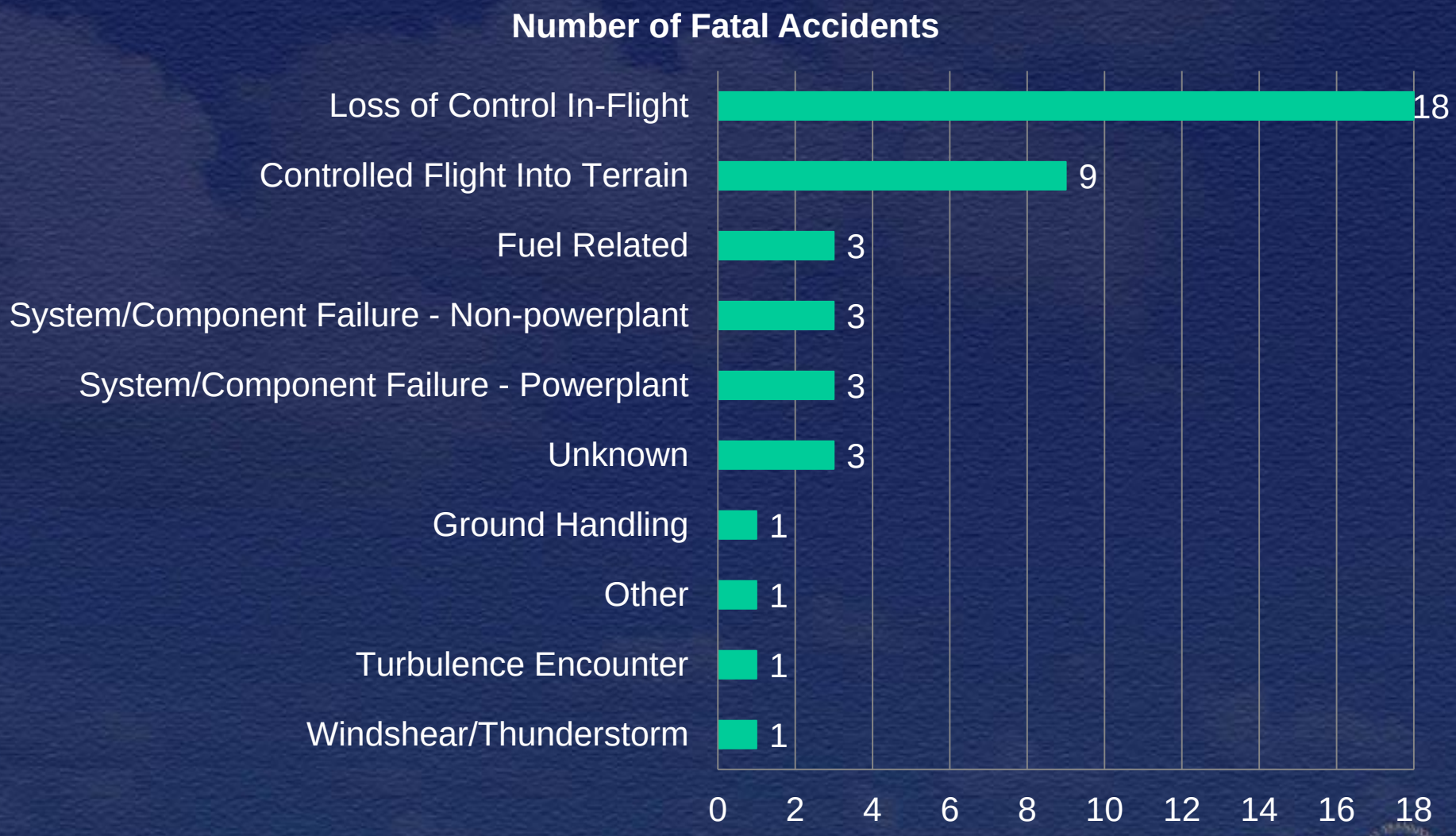
2015 MWL – Procedural Compliance

- ***Strengthen Procedural Compliance***
  - More than a dozen related commercial aircraft accidents in last ten years
  - Equally applicable to corporate and business operations
    - Implement well developed procedures
    - Train to the procedures
    - Emphasize and reinforce operations to the procedures

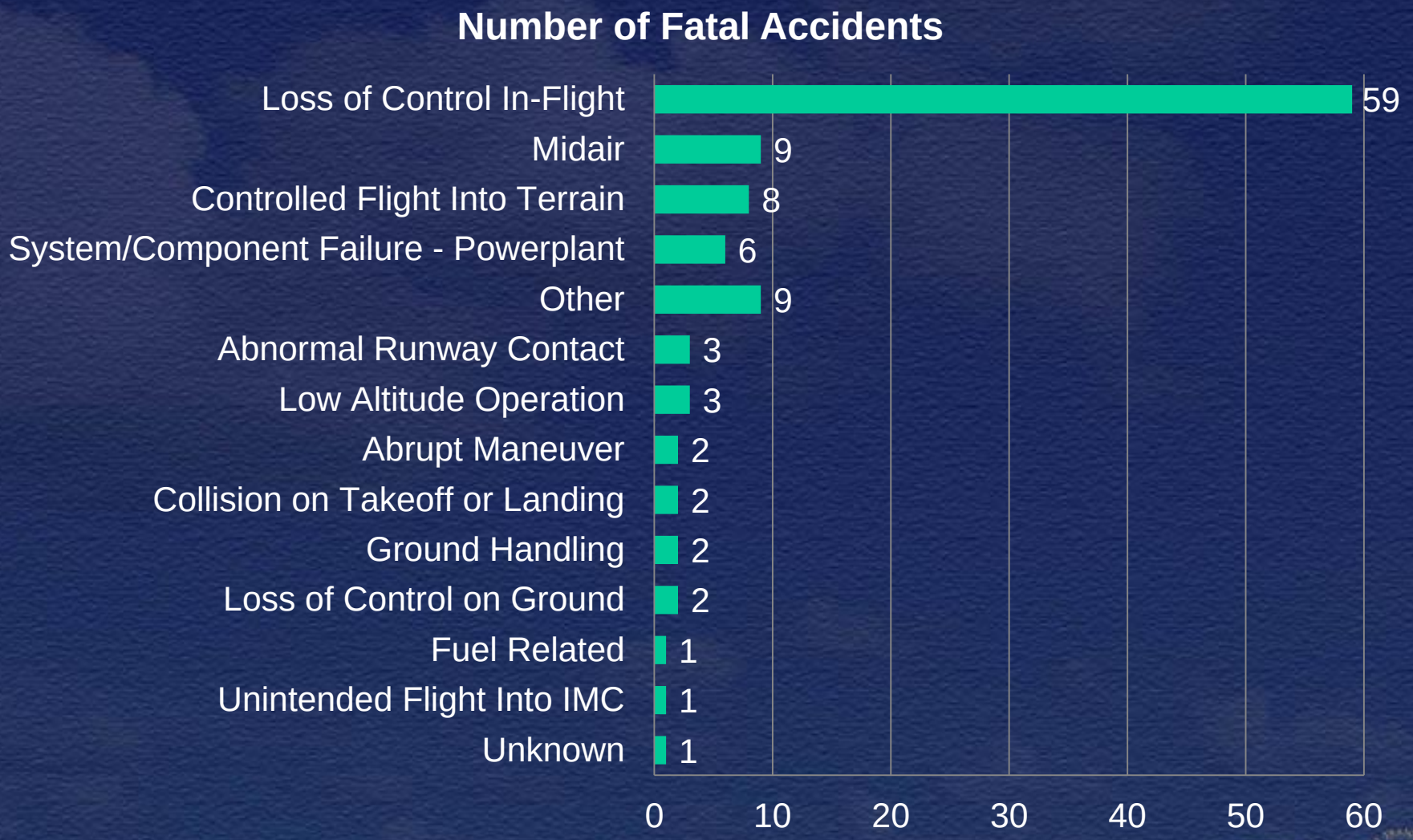
2015 MWL – Loss of Control

- ***Prevent Loss of Control in Flight in General Aviation***
- More than 40% GA accidents were LOC during 2001 – 2011
- Most deadly flight phases
  - Approach to landing
  - Maneuvering
  - Climb

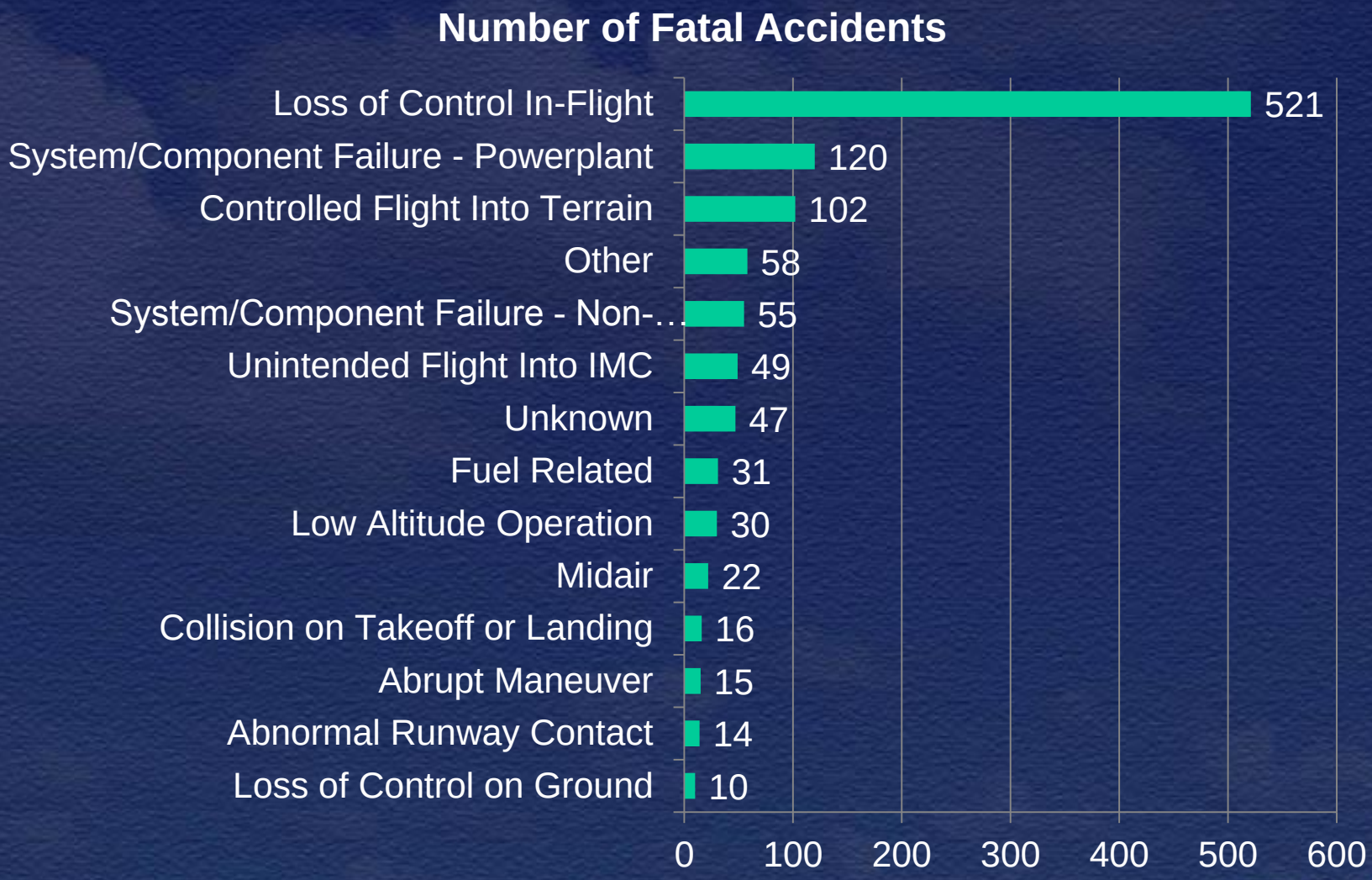
Business Flying, 2008-2013



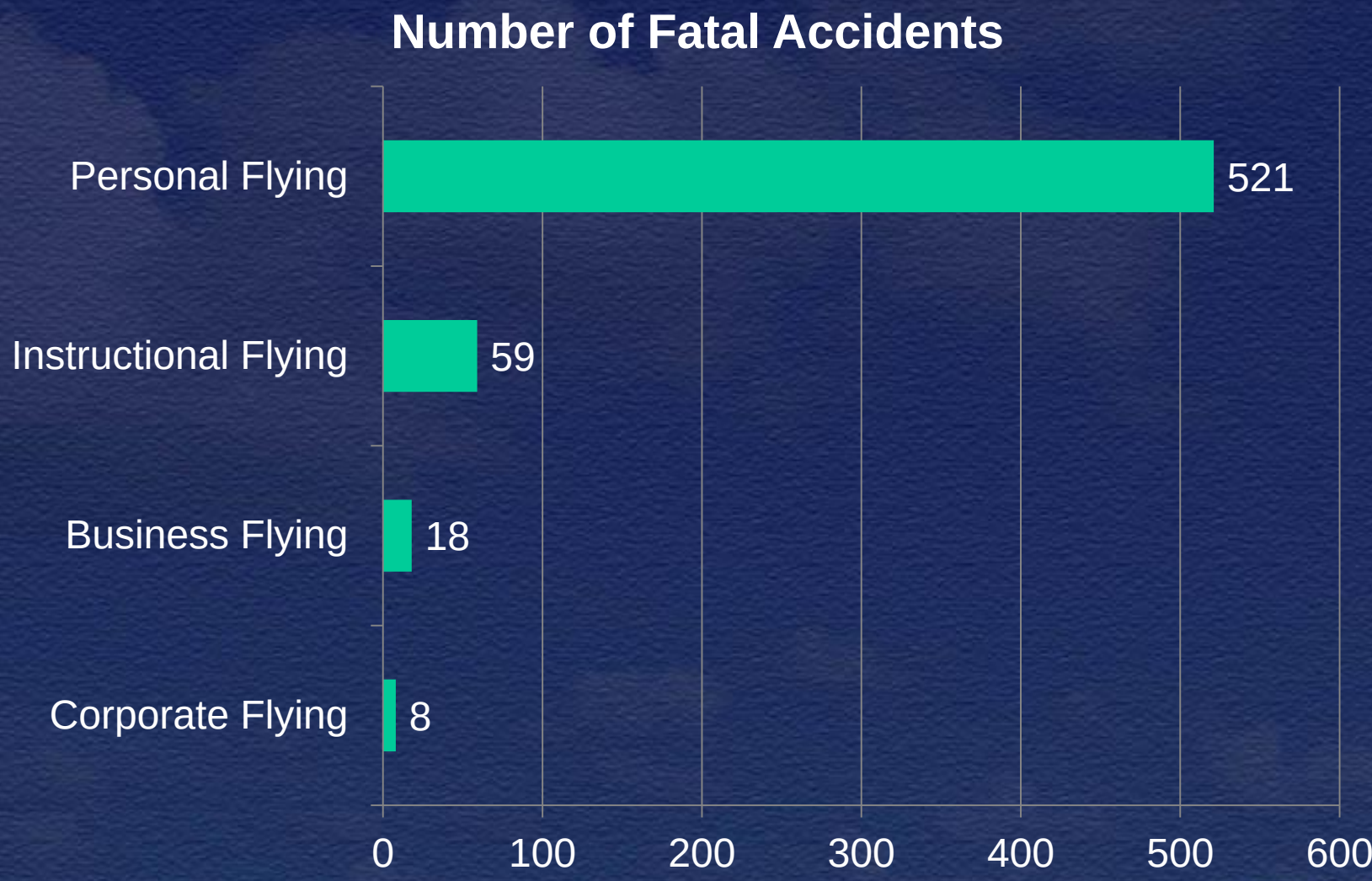
Instructional Flying, 2008-2013



Personal Flying, 2008-2013



Loss of Control In-Flight, 2008-2013



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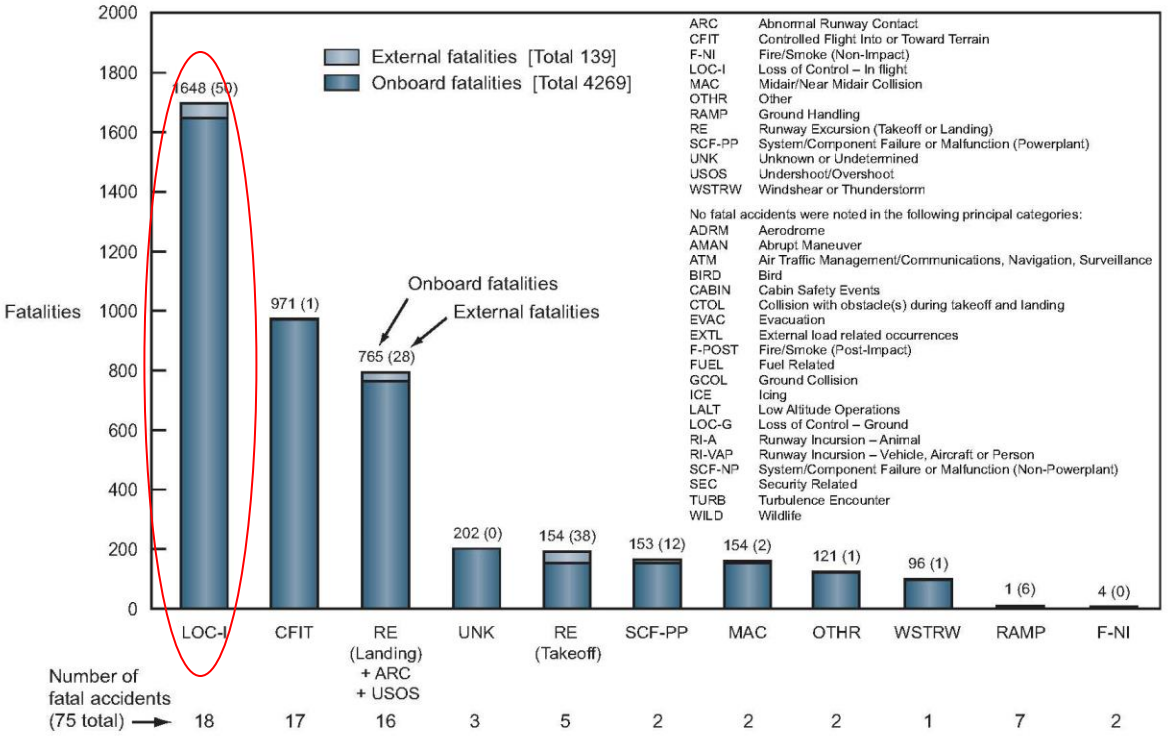
Boeing Annual Statistical Summery

Fatalities by CAST/ICAO Common Taxonomy Team (CICTT) Aviation Occurrence Categories

Fatal Accidents – Worldwide Commercial Jet Fleet – 2003 Through 2012

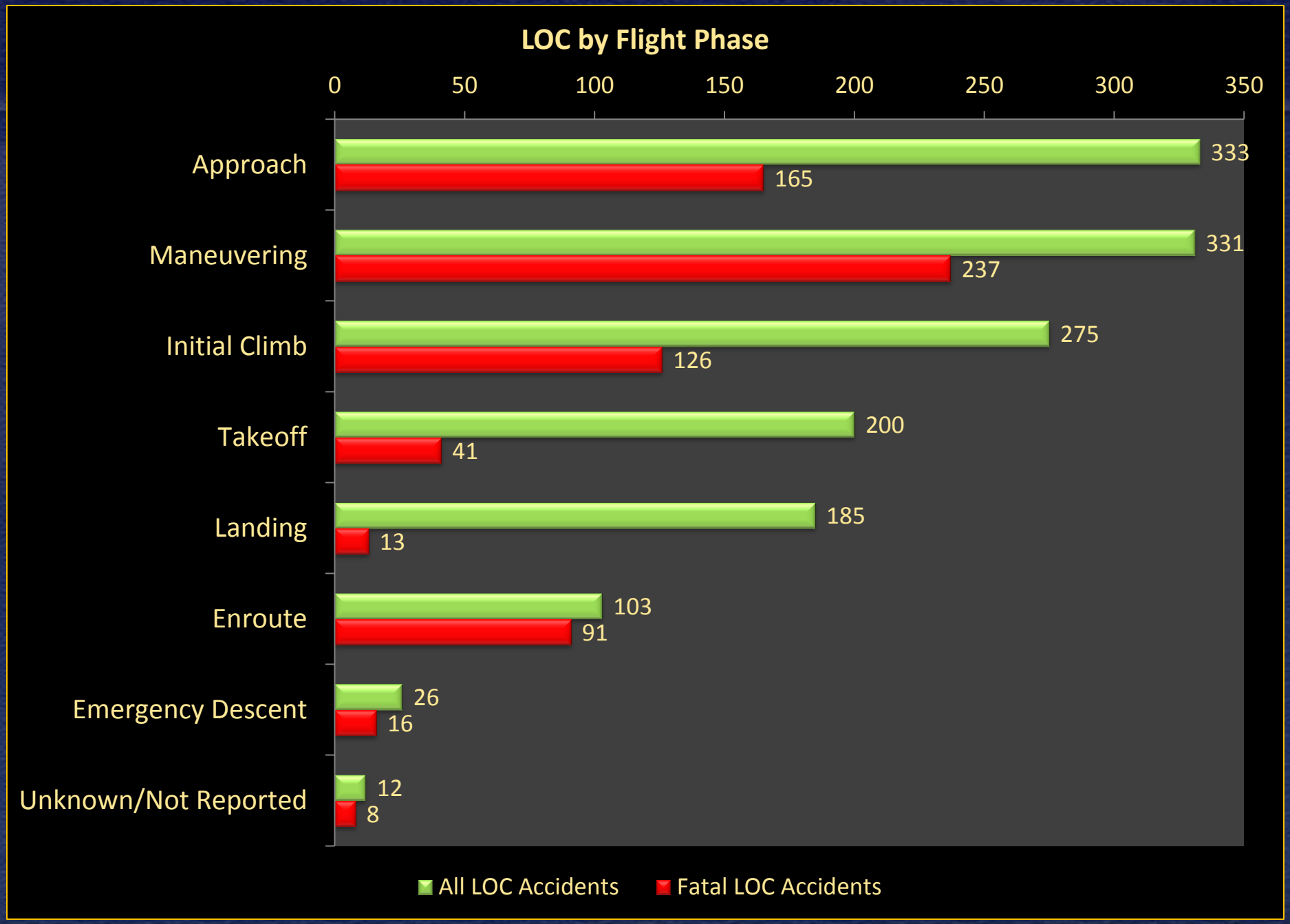


Note: Principal categories as assigned by CAST.

For a complete description of CICTT Aviation Occurrence Categories, go to: http://www.intlaviationstandards.org/

Primary category of accidents

Personal flying	–	LOC
Instructional flying	–	LOC
Business flying	–	LOC
Corporate flying	–	LOC
Airline flying	–	LOC


LOC by Flight Phase
0
50
100
150
200
250
300
350
Approach
333
165
Maneuvering
331
237
Initial Climb
275
126
Takeoff
200
41
Landing
185
13
Enroute
103
91
Emergency Descent
26
16
Unknown/Not Reported
12
8
All LOC Accidents
Fatal LOC Accidents

Fatal Airport LOC 2008-2014

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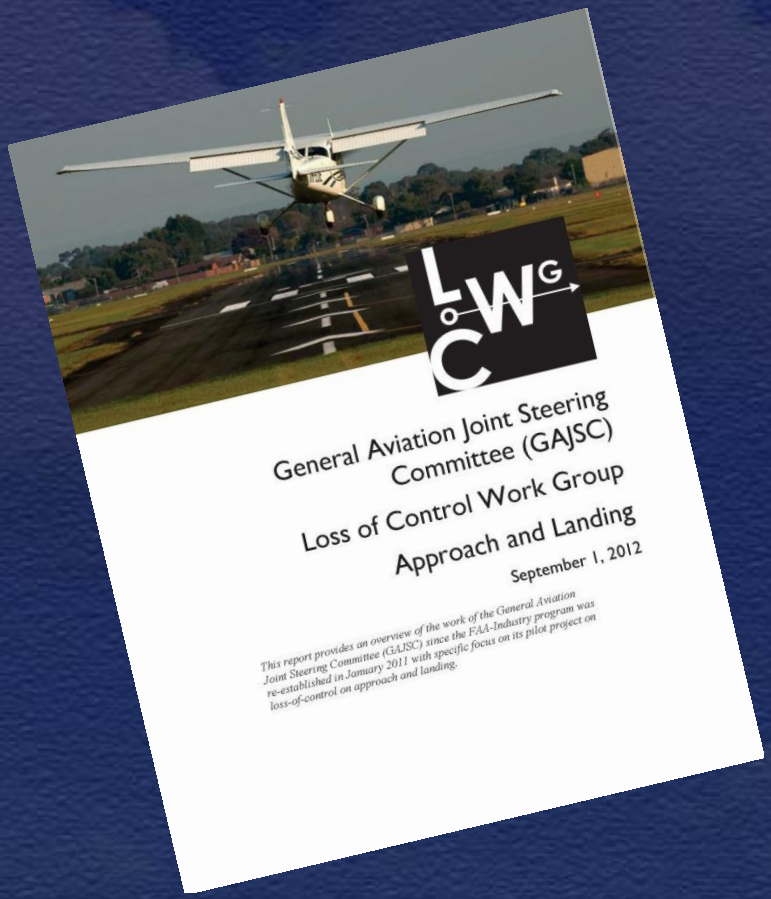
Loss-of-control Working Group



Safety Enhancements Identified

- AOA – New, Current, Retrofit
- Aeronautical Decision Making
- Stabilized Approach
- Single Pilot CRM
- Medication effects
- Weather Technologies
- Etc…

28 Safety Enhancements

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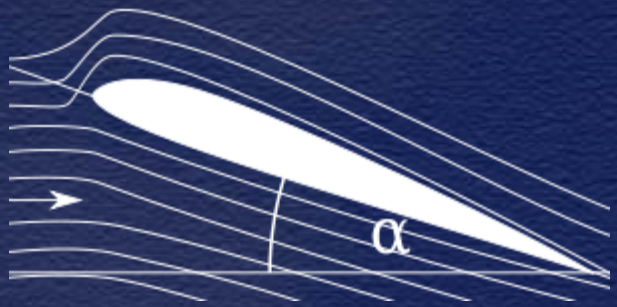
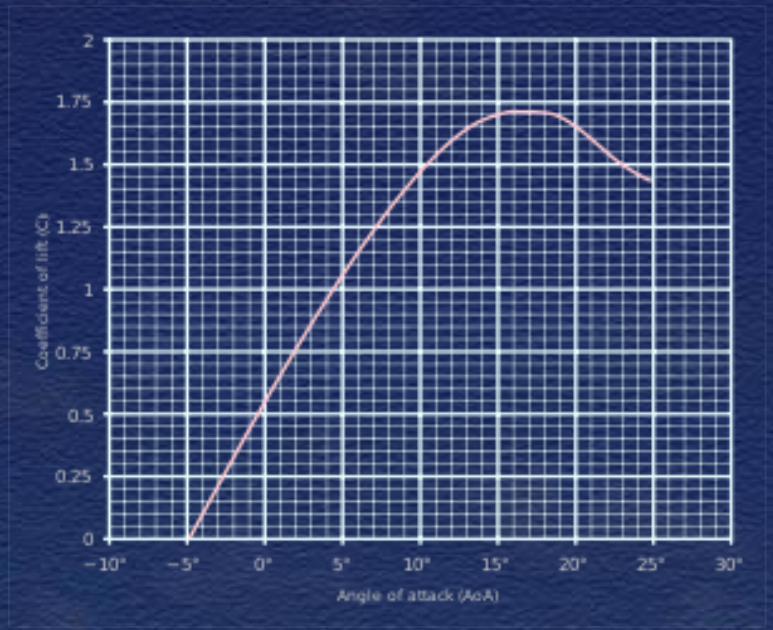
Lower Cost AOA Displays

- Stall occurs at a specific Angle-of-Attack
  - But not necessarily at the same airspeed



First of AOA indicators built to ASTM stds and installed as a minor mod



FAA installation policy changed

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Stall Recovery

- Reduce the angle-of-attack below stall AOA (Max CL)
  - Push over to eliminate stall warning
- Level wings
- Adjust thrust
  - Avoid overspeed and high G levels
- Pitch back to level flight
- Don’t try to “***Power out of a stall***”

NTSB Safety Alerts

- Preventing Aerodynamic Stalls
- Reduced Visual References
- Is Your Aircraft Talking to You
- Risk Management for Pilots
- Risk Management for Mechanics

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SAFETY ALERT
National Transportation Safety Board

Preventing Rote Callouts

Confirm Cockpit Indications Before Making Callouts

The problem

- Recent National Transportation Safety Board investigations have identified several instances in which pilots made callouts without first verifying the cockpit indication that corresponded with the callout.
- In these cases, the pilots acted out of habit and made callouts based on what they expected to see regarding the cockpit indication but did not take the time to verify it.
- Examples of accident investigations include the following:
  - A Boeing 757 overran the end of the runway while landing in Jackson Hole, Wyoming. The captain called out "deployed" even though the speedbrakes were not deployed and "two in reverse" even though the speedbrakes were fully deployed. Both the speedbrakes and the thrust reversers had mechanical defects, and the captain did not manually deploy the speedbrakes when they failed to deploy automatically because, based on his rote callout, he did not recognize that they did not deploy.[1]
  - A Hawker 800 crashed after a late go-around attempt in Owatonna, Minnesota. After touchdown, the copilot called out "we're dumped," but the flaps were not all the way in the lift dump position and the airplane did not slow down as expected, leading the pilot to attempt to go around.[2]

[1] Runway Overrun, American Airlines Flight 2253, Boeing 757-200, N668AA, Jackson Hole, Wyoming, December 29, 2010, Aircraft Accident Report NTSB/AAB-12/01 (Washington, DC: National Transportation Safety Board, 2012).
[2] Crash During Attempted Go-Around After Landing, East Coast Jets Flight 81, Hawker Beechcraft Corporation 125-800A, N818MV, Owatonna, Minnesota, July 31, 2008, Aircraft Accident Report NTSB/AAR-11/01 (Washington, DC: National Transportation Safety Board, 2011).

Available on www.NTSB.gov

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NTSB - Improving Transportation Safety

NTSB Structure

- The Board
  - Chairman
  - Vice Chairman
  - 3 Members
- Multi Mode
  - Aviation
  - Railroad
  - Highway
  - Marine
  - Pipeline and Hazardous Materials




NTSB

The Mission

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in the other modes of transportation – railroad, highway, marine and pipeline -- and determining the probable cause of the accident.

The NTSB also participates in investigations conducted by other countries when U.S. aviation safety interests are involved.

Lubbock, TX – ATR 42-320 Cargo Aircraft

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Gray Summit, MO – bus/vehicle/truck crash

NTSB

Port Arthur, TX – Eagle Otome Tank Ship

Washington, DC – Washington Metro Transit System

NTSB Responsibilities

- Determines Probable Cause based on investigation
- Issues recommendations aimed at preventing future accidents.
- Conducts safety studies.
- Conducts Forums and Symposiums on safety topics.
- Acts as U.S. accredited representative on foreign aviation accident investigations under the provisions of the International Civil Aviation Authority (ICAO) agreements.

NTSB Responsibilities cont'd

- Maintains official civil aviation accident database.
- Evaluates the effectiveness of emergency responses to hazardous materials accidents.
- Provides family assistance following accidents.
- Acts as an administrative appeals court for actions concerning airmen, air carriers and mariners.

Investigation Process

- An NTSB “Go-Team” is dispatched from Washington headquarters to major transportation accidents.

- A full “Go-Team” for a major accident typically includes the following:
  - Board Member
  - Investigative-In-Charge (IIC)
  - Technical specialists
  - Public Affairs/Government Affairs officers
  - Family Affairs Specialists

Arrival On Scene

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Arrival On-Scene

- Coordinate with local law enforcement authorities
- Establish our investigative resources at the accident site
- Establish an NTSB Operations Center
- Coordinate with Law Enforcement Command Post
- Confirm security arrangements
- Coordinate biohazard precautions with local authorities

Organization On-Scene

- Conduct an organization meeting
- Managed by the IIC
- Designed to:
  - Coordinate the investigative groups and the overall investigation
  - Identify NTSB participants
  - Establish and organize groups
  - Designate parties and party coordinators if appropriate
  - Specify Rules of Conduct of the NTSB investigation

Briefings

- Provided for both Press and Family (if applicable)
  - Factual information is reported to the media and families at least daily in briefings
  - The NTSB Board Member or IIC are the sole spokespersons for the investigation

Post On-scene

- Additional fact-finding work — including laboratory testing
- Analysis of the factual data
- Development of findings
- Probable Cause

Board Meeting

- The Board Members conduct a public meeting to discuss and approve a final report on the accident. The final report includes conclusions, a statement of probable cause, and recommendations.

Recommendations

- Safety recommendations are a major product of the Safety Board.

- Each Safety Recommendation:
  - Describes the action the board recommends.
  - States the safety need to be satisfied.
  - Designates the party or person expected to take action.

NTSB Office of Aviation Safety

All Civil Aviation Accidents
- Fatal
- Non-Fatal
- Midair
- Public-Use

Foreign Accidents of US Carriers

Foreign Accidents of US Manufacture or Design

Injury or Death of US Citizens

Nationwide NTSB Staffing

Just over 400 Employees (All modes)

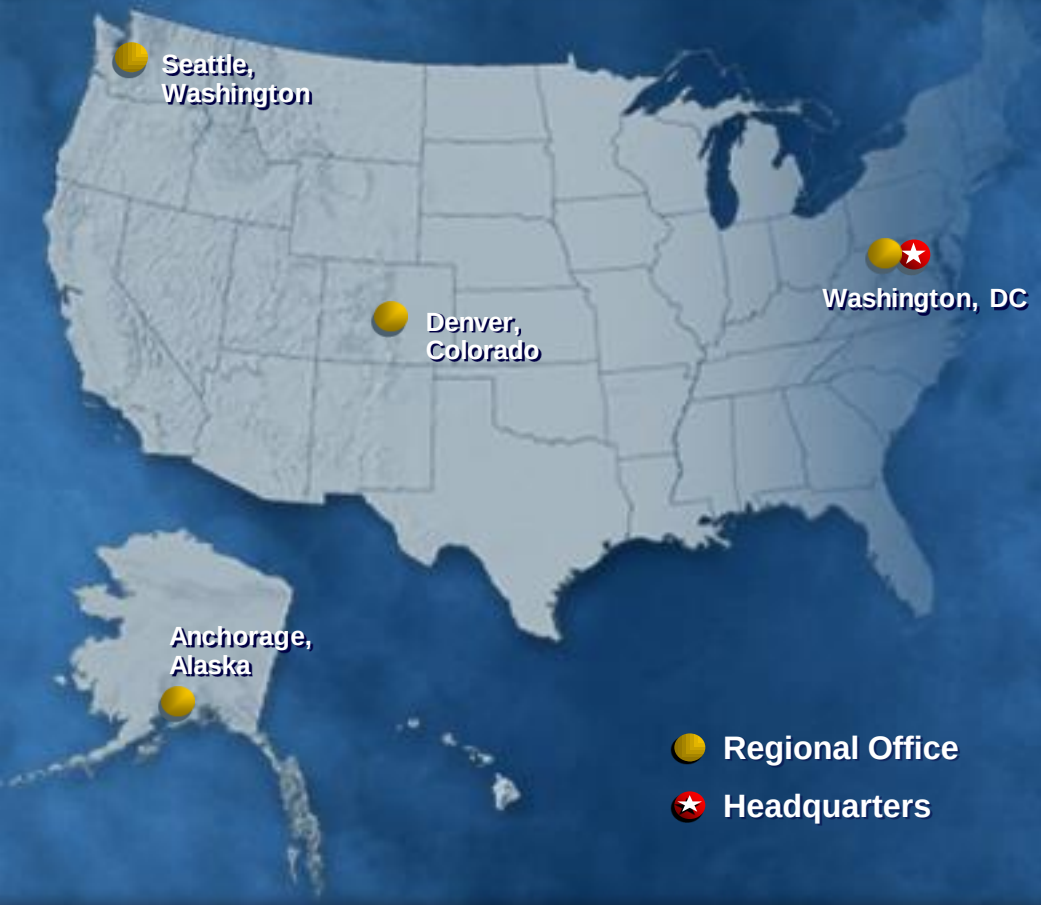
140 Employees (Aviation)

4 Regional Aviation Offices

50 Regional Aviation Investigators

6 (AS-10) Majors Investigators

The Office of Aviation Safety



- The Office of Aviation Safety is composed of about 100 investigators. About half of the positions are located in the headquarters office and the other half divided among the regional offices.

NTSB Headquarters
L'Enfant Plaza

Laboratories

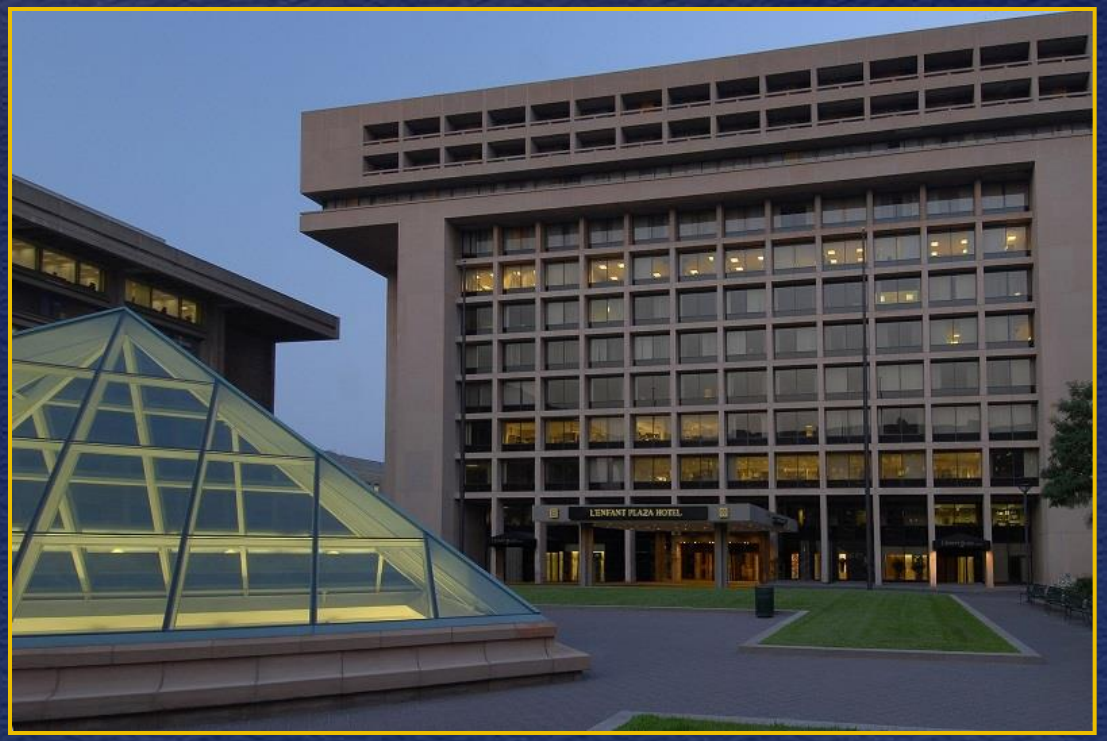
- CVR & FDR
- Materials (Met Lab)

NTSB Management

- Board Members
- Senior Staff
- Go-Team

NTSB ROC

- 24 / 7 Coverage



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24 hr Accident Notification

WWW.NTSB.GOV

NTSB Response Operations Center

844-373-9922

NTSB Response Operations Center
844-373-9922

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“Data Collection” Accident Investigation

- Known circumstances
- No fatalities
- Pilot interview
- Investigator will not travel
- No mechanical issues
- No Preliminary Report

“Limited” Accident Investigation

- No fatalities
- Pilot interview
- Investigator may not travel to the scene
- Mechanical issues

“Field” Accident Investigation

- Fatalities (Crew/Pax)
- Investigator will travel to scene
- Transportation Disaster Assistance (TDA) if required

“Field Major” Investigation

- Multiple Fatalities
- Strong Public / Media Interest
- NTSB “Go Team” with a NTSB Board Member
- Transportation Disaster Assistance (TDA)

“Major” Investigation

- Large 121 Carriers
- Full “Go Team” with NTSB Board Member

- Transportation Disaster Assistance (TDA)

The Party Process

The Safety Board investigates more than 1,500 aviation accidents and incidents a year and about 500 rail, highway, marine and pipeline accidents. With only about 400 employees, the NTSB accomplishes this task by leveraging its resources and designating parties to its investigations.

Typically, parties include:

- FAA
- Air Carrier / Operator
- Airframe manufacturer
- Engine manufacturer

Absolutely no news media, company media relations, attorneys, consultants, or insurance personnel are permitted to participate in any phase of the investigation, including meetings

What happens now?

Initial Notification Information

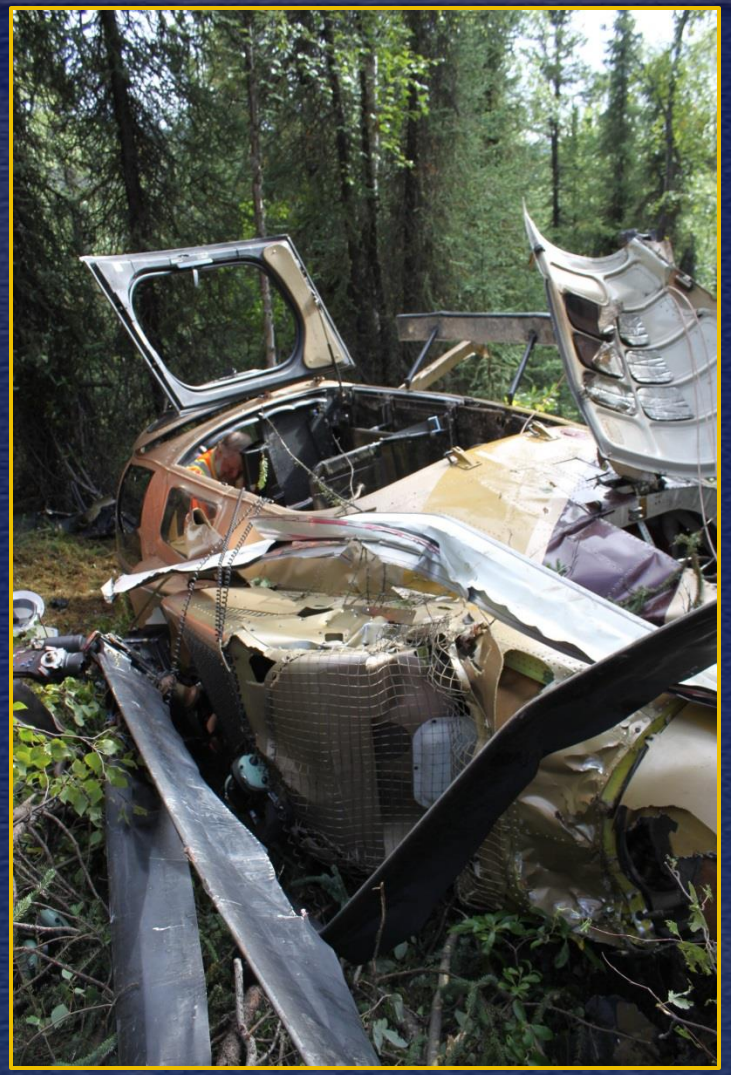
What to expect

First Hour:

- Operator management contact
- Who, what, when, and where?
- State Troopers, U.S. Air Force (RCC), Coast Guard, Park Service

Second Hour:

- Travel itinerary
- FAA investigator responding
- Airframe / Engine Air Safety Dept.
- Offer party status



Regional Investigative Team

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Regional Investigative Team

- NTSB Investigator
  Investigator-In-Charge (IIC)

Regional Investigative Team

- NTSB Investigator
  Investigator-In-Charge (IIC)

- FAA Investigator
  Not the operator's POI or PMI

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Regional Investigative Team

- NTSB Investigator
  Investigator-In-Charge (IIC)
- FAA Investigator
- Airframe Investigator

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Regional Investigative Team

- NTSB Investigator
  Investigator-In-Charge (IIC)
- FAA Investigator
- Airframe Investigator
- Engine Investigator

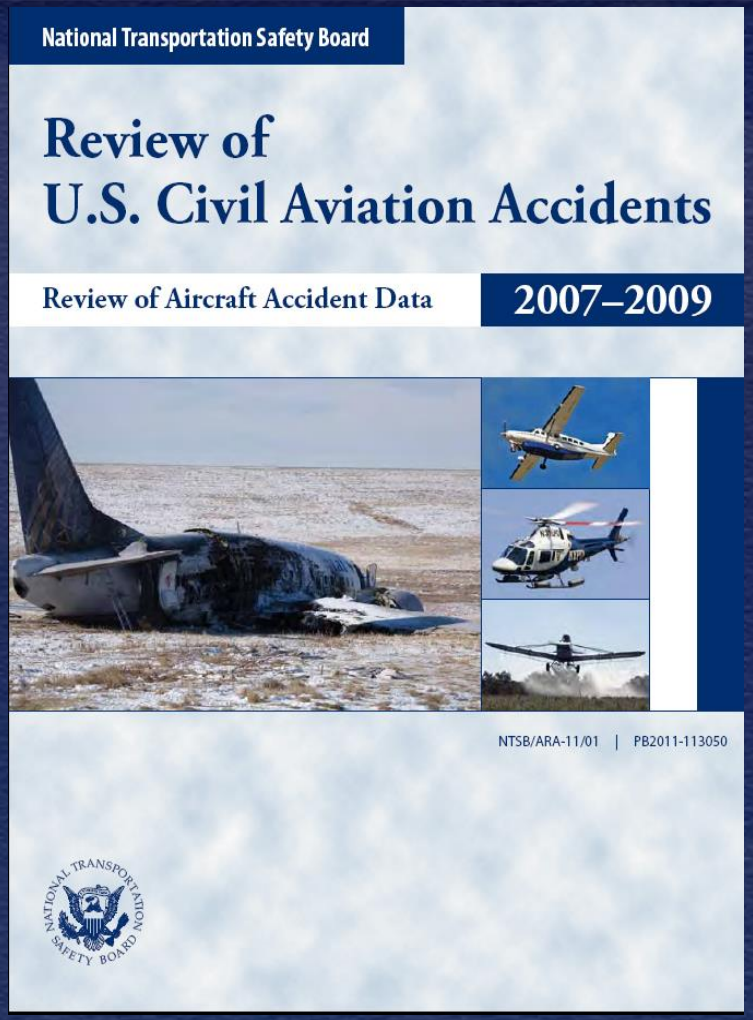
Party Member Expectations

- Undivided Attention
  - On scene – 3 days
  - Component testing - Travel
  - Interviews
- Operational Experience
  - Chief Pilot, Director of Safety
  - Insight into corporate culture
- Team Player
  - Able to work in groups, as a team member

Alfred Sheinwold

"Learn all you can from the mistakes of others. You won't have time to make them all yourself"

Accident Investigations



- NTSB accident files are on-line
- Many recent accident Dockets are on-line
  - Factual reports,
  - Interviews
  - Photographs
- www.ntsb.gov

http://www.ntsb.gov/doclib/reports/2011/ARA1101.pdf

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Douglas Adams

"Human beings, who are almost unique in having ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so."

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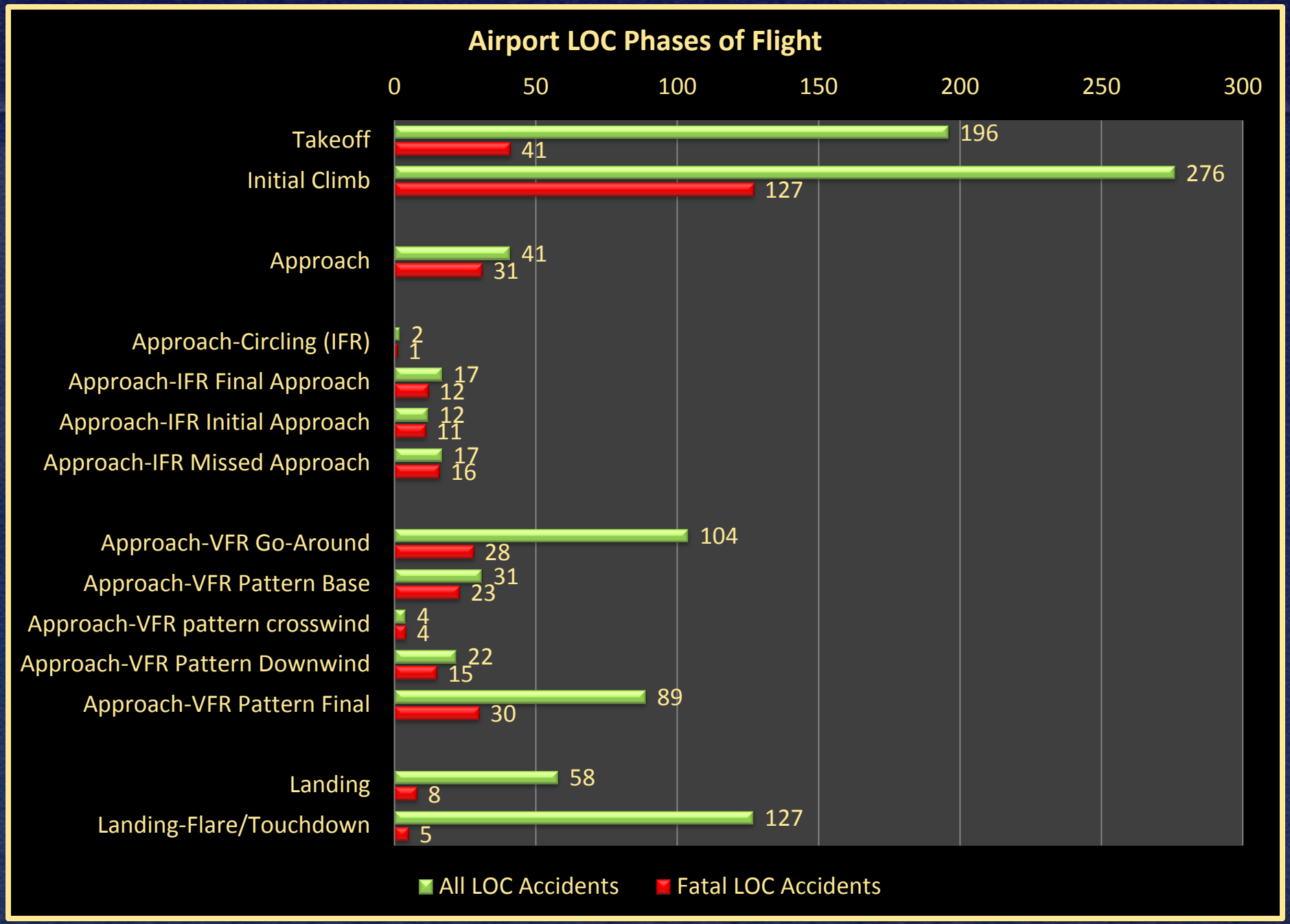
Airport LOC Phases of Flight
0
50
100
150
200
250
300
Takeoff
196
41
Initial Climb
276
127
Approach
41
31
Approach-Circling (IFR)
2
1
Approach-IFR Final Approach
17
12
Approach-IFR Initial Approach
12
11
Approach-IFR Missed Approach
17
16
Approach-VFR Go-Around
104
28
Approach-VFR Pattern Base
31
23
Approach-VFR pattern crosswind
4
4
Approach-VFR Pattern Downwind
22
15
Approach-VFR Pattern Final
89
30
Landing
58
8
Landing-Flare/Touchdown
127
5
All LOC Accidents
Fatal LOC Accidents

Flight Purpose